



The impact of heat on mortality and morbidity in the Greater Metropolitan Sydney Region: A case crossover analysis

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Abstract:

Background: This study examined the association between unusually high temperature and daily mortality (1997-2007) and hospital admissions (1997-2010) in the Sydney Greater Metropolitan Region (GMR) to assist in the development of targeted health programs designed to minimise the public health impact of extreme heat. **Methods.** Sydney GMR was categorized into five climate zones. Heat-events were defined as severe or extreme. Using a time-stratified case-crossover design with a conditional logistic regression model we adjusted for influenza epidemics, public holidays, and climate zone. Odds ratios (OR) and 95% confidence intervals were estimated for associations between daily mortality and hospital admissions with heat-event days compared to non-heat event days for single and three day heat-events. **Results:** All-cause mortality overall had similar magnitude associations with single day and three day extreme and severe events as did all cardiovascular mortality. Respiratory mortality was associated with single day and three day severe events (95 thpercentile, lag0: OR Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.14; 95%CI: 1.04 to 1.24). Diabetes mortality had similar magnitude associations with single day and three day severe events (95thpercentile, lag0: OR Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.22; 95%CI: 1.03 to 1.46) but was not associated with extreme events. Hospital admissions for heat related injuries, dehydration, and other fluid disorders were associated with single day and three day extreme and severe events. Contrary to our findings for mortality, we found inconsistent and sometimes inverse associations for extreme and severe events with cardiovascular disease and respiratory disease hospital admissions. Controlling for air pollutants did not influence the mortality associations but reduced the magnitude of the associations with hospital admissions particularly for ozone and respiratory disease. **Conclusions:** Single and three day events of unusually high temperatures in Sydney are associated with similar magnitude increases in mortality and hospital admissions. The trend towards an inverse association between cardio-vascular admissions and heat-events and the strong positive association between cardio-vascular mortality and heat-events suggests these events may lead to a rapid deterioration in persons with existing cardio-vascular disease resulting in death. To reduce the adverse effects of high temperatures over multiple days, and less extreme but more frequent temperatures over single days, targeted public health messages are critical.

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Resource Description

Early Warning System: ☒

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resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact:

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Injury

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Children, Elderly

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

Climate Change and Human Health Literature Portal

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content